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O U R C O V E R

JUSTIN L. POWERS

JUSTIN L. POWERS is well known in pharmaceutical circles both for his ability as well as the many positions of responsibility that he fills.

He graduated from the College of Pharmacy of the University of Michigan in 1919 and served on the faculty of Washington State College until 1923. In 1924 he received his B. Sc. degree from Michigan and then taught at the College of Pharmacy of Oregon State College for two years. In 1927 he obtained the M. Sc. degree from Michigan and in 1935 a Ph. D. from the University of Wisconsin.

In 1940, Dr. Powers became chairman of the National Formulary Committee and Director of the Laboratories of the American Pharmaceutical Association. In January this year he assumed the editorship of the Scientific Edition of the Journal of the American Pharmaceutical Association.

With these three positions Dr. Powers conducts much of the important work of organized pharmacy. The National Formulary, Seventh Edition reviewed this month is revised under his supervision as chairman. We feel that Dr. Powers does a quiet, well ordered good job for pharmacy and that its ranks could well afford more men like him.

E D I T O R I A L

"BY THEIR DEEDS SHALL YE KNOW THEM"

THE cover of a recent issue of *Drug Topics* carries a rather interesting summary of resolutions passed at this year's meetings of the various state pharmaceutical associations. Those resolutions receiving the attention of four or more groups are listed in the order of their importance from the standpoint of the number of organizations adopting such a resolution.

Listed among the important matters considered are Pharmacy's standards, recognition of pharmacy in the armed services, support of the war effort, the necessity of pharmacists on boards of health, etc. One might ponder at considerable length which of these urgent matters was uppermost in the minds of those many thoughtful delegates in whose care lay the reputation and future of pharmacy but the subject given paramount consideration is nauseating to every man who really believes in and struggles for his profession.

We learn that 41 organizations passed resolutions to support "Nationally Advertised Brands Week" while only 16 were interested in seeing pharmacy properly recognized in the armed services and only 11 were the least concerned with the matter of professional standards.

In this summation we learn much more than what occupies the interest of pharmacists; we have indeed an excellent diagnosis of what is wrong with pharmacy and why it isn't respected and recognized as it should be.

There is nothing particularly evil about "Nationally Advertised Brands Week" except that, in these times of chaos and suffering, it hardly deserves the primary attention of professional men whose avowed interest is the national welfare and health. With the mounting problem of how to coordinate our public health services to obtain maximum efficiency Pharmacy proclaims its major interest in *National Brands*.

This writer is willing to admit the necessity of certain fundamental business practices in the conduct of pharmacy and to a greater degree than in other allied professions but certain commercial interests have so exploited pharmacy that we are their willing and subservient tool to be used only as a convenient channel lying between them and the public. We accept their bait and approbation and fall victims to trends and practices which both degrade us and in some few cases make us guilty of actually aiding and abetting in the distribution and sale of worthless drugs—drugs which the medical profession has long since exposed as either valueless, dangerous or even worse. Is it any wonder that when we cry for the rights and privileges due a profession we are without outside support? Is it any wonder that medical groups consider our proposals for greater collaboration with “tongue in cheek”?

Our own leaders recognize these evils but avoid any public action with the well-worn plea of the necessity of being tolerant and broad-minded. Most of the pharmaceutical press, which is read to any extent, is restrained from open criticism by the necessity of expediency and those of us who remain are indeed but a voice crying in the wilderness, unheard and unheeded.

L. F. TICE.



THE ACTION OF A CHLORINATED WATER SUPPLY UPON LEAD PIPE

By George G. Schaut

The author reports upon his investigations on the effect of chlorinated water on lead pipe. Other workers in this field have not duplicated the conditions existing in an actual distribution system.

SEVERAL years ago Quam and Klein (1) made a study of the action on lead pipe of a public water supply. The conditions under which their tests were conducted did not entirely fulfill those encountered in the distribution of a water supply. In their work the water was poured into the lead pipe and allowed to remain for a definite period, whereas, in a distribution system the water is subjected to a pressure sufficient to force it to its furthest point. Neither did they publish results of contact periods of shorter duration than twenty-four hours nor observations at maximum water temperature.

Their work prompted the writer to investigate a system in conformity with actual conditions as they exist in the distribution of a potable water supply, where the water containing chlorine to the extent of that used for sanitary purposes is under pressure sufficient to maintain its proper distribution, and thus to learn how under these conditions it affects lead service pipe during different seasons of the year. At the time of the writing of this paper Ruchhoft and Kachmar (2) published the results of their academic investigation of lead solubility and here again the data shed no light on what would be obtained under distribution conditions.

After looking over the various methods for the quantitative estimation of lead in small quantities, especially those applicable to its determination in water and not overlooking the dithiazone method as now found in Standard Methods of Water Analysis it was decided to use the method proposed by Reith and de Beus (3) which utilizes the well known sulfide reaction for lead, in this case in an ammoniacal medium. It was found that this method could be used to determine lead directly on 80 cc. of water in a 100 cc. Nessler tube when the water contained as small a quantity of lead as 0.01 p. p. m. as Pb. Of course, corrections for color and iron must be made and, as the authors outlined, are easily controlled and evaluated.

As a standard solution of lead is of prime importance and was to be made from lead nitrate, it was decided to purchase lead nitrate crystals as represented by C. P. grade and make an assay for lead. Preliminary to assaying lead, several moisture determinations (drying with sulfuric acid) were made and the loss on a 5-gram sample was 0.7 mg. So, the salt as purchased could be considered dry. The method used to assay lead was the gravimetric determination of lead as lead sulfate, weighing in a specially prepared Gooch crucible. Several determinations of lead gave an average value of 99.32 per cent. $\text{Pb}(\text{NO}_3)_2$ which is in excess of the minimum standard specification of 99.00 per cent.

All standard solutions of lead nitrate were made from this salt and were found to show practically no variation over a period of a year. All glassware used was of the Pyrex variety with the exception of the Nessler tubes for color comparison—these being of Kimble EXAX laboratory glass.

As standard solutions and lead standards require distilled water, it is quite obvious that a distilled water low in lead must be used. The ordinary distilled water in our laboratory collected in non-Pyrex bottles, i. e., just high grade chemical laboratory glass bottles showed values for lead in the region of 0.01 p. p. m. as Pb. Whereas, by distilling a high grade spring water in an alembic of tin-lined copper, connected to a block tin worm and collecting the distillate in Pyrex bottles it was possible to get water having a lead content ranging from 0.001 to 0.006 p. p. m. during the various seasons in which spring water was collected. Any distillate of 0.005 or less was acceptable for the investigation reported herein. Letonoff and Reinhold (4) working in the laboratory of one of our local hospitals prepared distilled water freed from lead by redistillation in a Pyrex still after the addition of a few drops of phosphoric acid.

Under natural conditions the variables—alkalinity, chlorine, temperature, carbon dioxide, dissolved oxygen, etc., are not ordinarily controllable, for when the water has the desirable alkalinity to make an observation, perhaps the chlorine residual and/or temperature are not desirable. Even though the author felt at times tempted to vary the chlorine application of the municipal supply rather than delay an observation, or to make observations at different chlorine residuals, yet this is not to be tampered with when the health of a community is at stake. Hence, as for chlorine concentration it ap-

peared desirable to select the value 0.12 p. p. m. This value is more frequently found in the tap water at the laboratory and also at the author's home during all seasons. However, one exception was observed at the author's home. Due to the distance from the point of chlorine application it was found that when the temperature of the water was near or at its maximum, the residual chlorine was *nil*. So, with this exception, the 0.12 p. p. m. value was considered the datum point. The common natural characteristics of the water used are shown in Table I.

TABLE I
NATURAL CHARACTERISTICS OF WATER USED

	Winter Water	Summer Water
Temperature F	35-40	80-85
Dissolved Oxygen % Saturation	100	40
pH	6.8-7.0	7.0-7.2
CO ₂ (free)	3-4 p. p. m.	7-8 p. p. m.
Alkalinity (CaCO ₃)	35-40 p. p. m.	45-50 p. p. m.
Chlorides (Cl)	7 p. p. m.	10 p. p. m.
Hardness (soap)	120 p. p. m.	140 p. p. m.
Iron (Fe)	0.10 p. p. m.	0.10 p. p. m.

In choosing to work with old lead service pipe (thirty-five years old, five of which were before chlorination was practiced) at the author's home, it was quite obvious that the pipe should not be disturbed by taking it up and relaying in a more convenient place, where no one would be inconvenienced by prolonged shut-offs, for the internal coating might easily be disrupted. Neither was it to be expected that an entire stranger would permit one to play around with their service pipe for the benefit of science just because it happens to be near a filter plant where residual chlorine might still be present in the water during the summer. So, this accounts for not being able to collect data for water at its maximum temperature with chlorine in it. From the data obtained, and deductions of a more or less practical nature it is possible to glean a bit of information, with a little degree of certainty, as to what might be expected if chlorine were also present.

New lead service pipe ($\frac{5}{8}$ -inch internal diameter) was placed in the ground close to the laboratory. A coil of the same pipe was also placed in the laboratory where it required a little over an hour for incoming water of minimum temperature to reach the temperature

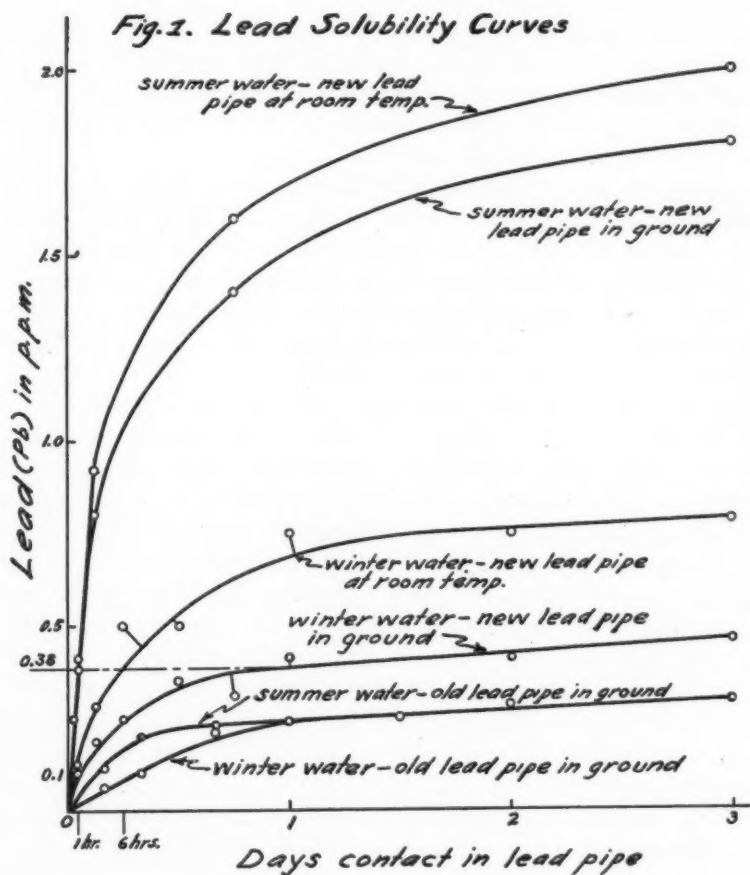
of the room, i. e., 75 degrees F. In the winter, the ground conditions were such that water left in lead pipe for a relatively short time acquired a temperature of 54 degrees F. In summer, the temperature acquired by the water in lead pipe in the ground at the laboratory was not unlike that of the water itself. Whereas, in the lead service pipe at the author's house the temperature was found to drop to 70 degrees F. This difference is accounted for by the fact that the lead service pipe at the author's house is buried deeper than was that at the laboratory.

A September, 1937, monthly composite of daily samples direct from the various filter plants, stored in Pyrex bottles and never having contacted lead pipe, showed values for Pb of 0.04 to 0.05 p. p. m. for the Schuylkill River plants, whereas, Torresdale water only contained 0.02 p. p. m. When this was repeated for October, 1941, which was at the end of a drought summer and all natural mineral constituents were greatly concentrated, the values for the effluents of the Schuylkill River plants were found between 0.02 and 0.06 p. p. m. Torresdale was again found to be 0.02 p. p. m. During the winter time the lead values approach zero. These values are well below the allowable limit of 0.10 p. p. m. Abroad, the limit for lead is somewhat higher, and some countries permit as much as 0.3 p. p. m.

In Fig. 1 may be seen the principal data put into the form of curves and it is more than just a coincidence that all these curves finally have the same slope. More than one of the curves from new lead pipe had points of twice the contact time than shown and thus verified the statement as to the slope. The values from which the curves were made are *net*, i. e., any lead in the water as it entered the lead pipe was deducted from the total found in the water drawn from the pipes. Only the difference is plotted. *Winter water* is that having a range of temperature between 35 and 40 degrees F. while the *summer water* had a range of 80 to 85 degrees F.

Discussion

The pH of the water used does not vary widely and there is very little change upon standing in the pipe. However, very early in this study, it was observed that the alkalinity of the water contacting new lead pipe played an important role. During a short contact period (up to three hours) other factors as temperature,



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chlorine and time being nearly constant, any change in alkalinity is not reflected in the lead dissolved by the water, whereas, when the time interval is lengthened to around twenty-four to forty-eight hours, then in the case of *winter water*, doubling the alkalinity almost doubled the lead content. With *summer water* the increase in lead due to increased alkalinity is not quite so pronounced, chiefly because of the rapidity with which the higher temperature water naturally acquires lead from the pipe. A study of the values for varying alkalinity

upon lead service pipe reveal a little different situation. Surely, the trend is the same, for when the water is at minimum temperature, doubling the alkalinity produces only a slight increase in lead—far from double. As the temperature rises a change in alkalinity produces an even less noticeable variation. This probably is accounted for by the fact that the white coating in the old service pipe is a basic carbonate of lead and rather passive to the range of alkalinity found in the water used.

With the alkalinity and residual chlorine constant and allowing a contact time of eight hours in new lead pipe in the ground, the relation between water temperature and lead brought into solution by the water proved to be a straight line for several points when plotted on cross-section paper, with the extremes showing that doubling the temperature doubled the lead value. Undoubtedly the combination chlorine and warm water dissolve more lead than the water would without chlorine. When *summer water* containing chlorine remains in new lead pipe the chlorine is dissipated at a rate depending chiefly upon the temperature, other factors being equal or nearly so. At the time when the chlorine becomes almost *nil* (one hour for *summer water*) the water then has acquired a lead content equivalent to the formation of PbCl_2 . At the time the residual chlorine becomes *nil*, for new lead pipe under all temperature conditions, a constant lead value acquired by the water was found, namely 0.38 p. p. m. as Pb. This value deducted from any lead values beyond this point probably give the lead values that the water itself could acquire without chlorine.

In the case of old lead pipe, under the two conditions studied, up to three days' contact, the lead value did not come up to the 0.38 p. p. m. value as may be observed in Fig. 1. With the alkalinity and chlorine constant, and allowing a contact time of eight hours in old lead service pipe, the water temperature-lead relation shows that from 40 degrees to 70 degrees F. there is only a 50 per cent. increase in the lead dissolved by the water. Unpublished data in the possession of the author convince him that it is almost a straight line, and for all practical purposes could be so assumed, between these points. Beyond this temperature the fixed value for chlorine, i. e., 0.12 p. p. m., could not be obtained for reasons cited before. To say what the lead value would be at maximum temperature if 0.12 p. p. m. of chlorine were also present, for old services, can only be a matter of conjecture.

Surely, one would expect it to be more than the value 0.20 which was found for maximum temperature and eight-hours' contact period when chlorine was no longer present. If the author were asked to surmise a value for these conditions he would like to think of it as that approaching a 75 per cent. higher value than was actually found with chlorine absent. Also, if sufficient data could have been obtained for a curve, it probably would be found somewhat above that of *winter water* in new lead pipe in the ground.

Something else that seems to come to light upon perusing the data and using the foregoing deduction is, that the chlorine contributes its lead equivalent about equally (on a percentage basis) in old and new lead pipe at maximum water temperature. At least, this appears to be true for the eight-hour contact time. If this is accepted then one might be justified in saying that, for water at maximum temperature with no chlorine in new lead pipe in the ground, the proposed curve might be midway between that of *summer water* in new lead pipe in the ground and *winter water* in new lead pipe at room temperature. From this, it would be observed that even without chlorine the new lead pipe imparts lead quite generously to the water when at maximum temperature. Subsequent work in the future when conditions are favorable may definitely establish these missing curves.

The time it takes for the water to acquire 0.10 p. p. m. of Pb, in the case of new pipe with *summer water* containing a chlorine residual which is normal sanitary practice, is very short, i. e., one-quarter hour. Whereas, in the winter, the cold water retards the action somewhat and the time is approximately one-half and one hour respectively for pipe at room temperature and in the ground. In the case of old pipe (thirty-five years' service, five of which were before chlorination was practiced) the time is somewhat extended for *summer water* without chlorine and appears to be of the order of three hours. Whereas, *winter water* containing chlorine residual of 0.12 p. p. m. required a time of eight hours (the normal overnight sleeping period) to acquire 0.10 p. p. m. of Pb.

The formation of the white basic lead carbonate coating, on the inside of lead pipes, did not occur during a year of service for new lead pipe. In its place was found a very thin coating of a rusty brown color which, from tests at the end of a year, still permitted

the water to take up the same amount of lead as when the pipe was used for the first time.

From observation of a piece of lead service pipe taken out of the street only a block from the author's residence and always receiving the same water supply for the same length of time, i. e., thirty-five years, it was observed that the white coating, which it very likely acquired during the five years previous to the practice of chlorination, was still present. Undoubtedly this coating is not being removed at a very fast rate in this locality, and will continue to serve as somewhat of a protective coating for the pipe as to further corrosion and also keeps the lead content of the water in it at a minimum for many years to come.

Conclusion

The experimental data do not place one in a very favorable position to evaluate any effect of carbon dioxide (CO_2) and dissolved oxygen (D. O.) individually as the *summer water* contained twice the amount of CO_2 as that found in the winter. The dissolved oxygen values were just the reverse for the two waters. It is pretty generally acknowledged that waters with an alkalinity as herein encountered and carbon dioxide (free) no higher, at least, than shown in Table 1, attack lead very little if at all, due to the carbon dioxide itself. However, for any one type of water *viz.* winter or summer the CO_2 and D. O. are constant and, with the selection of data corresponding to times when the other factors shown in Table 1 were more or less constant, it appears evident in the case of new pipe that chlorine in water adds its little equivalent contribution of lead to the water. This is in addition to any other that finds its way into the water due to any of its natural constituents. This lead, equivalent to the chlorine, might be thought of as an *initial shot* which the water acquires by virtue of its having residual chlorine.

One need not become unduly alarmed as to the situation. Today practically all of the lead service connections are relatively short. The actual volume of water in the service is correspondingly small, and even though this volume of water might move as a unit when a spigot is opened, still there is some mixing of this water, and also diffusion of the lead salt into surrounding water. Professor Negus (5) did not fail to discuss the subject of plumbism in his rather complete dissertation on the physiological aspects of mineral salts in

public water supplies. Kehoe *et al.* (6), at a later date in their exhaustive study, also throw a ray of hope upon the lead situation, for it appears as if a person may consume 1 to 2 mg. of lead per day and still excrete so much of it that no poisoning will result. As a matter of fact, it is pretty generally conceded that a normal healthy person can get rid of a milligram or more of lead per day without discomfort. The lead ingested from ordinary foods and beverages will average about 0.3 mg. per day, so one should not become too alarmed about the danger of lead poisoning from the food, especially when the question of sprayed or dusted food is raised.

Acknowledgments

The author would be very ungracious if he did not mention about the generous help received from the various members of the Laboratory Staff.

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A CORRECTION

In the April, 1942, issue T. Swann Harding in his "Facts About Sugar" introduced some fiction. The 2 pounds per capita per week consumption covers sugar consumed in all forms and not just that purchased as sugar. After having read and approved these figures before publication, the Washington "experts" now belatedly correct this error. The editor is reminded of an old saying "That if all the statisticians were placed end to end they would not reach a conclusion."

THE SULFONAMIDES IN THE TREATMENT OF VARIOUS COMMON SKIN DISEASES *

By E. William Abramowitz

The use of sulfonamides locally is arousing considerable interest among medical men. The author, a dermatologist, reviews certain observations on the use of these drugs in various skin disorders.

THE development of sulfonamides dates back to 1845 when Gerhardt introduced sulfanilic acid. The latter was utilized by Ehrlich as a reagent for detecting certain aromatic substances in the urine—the diazo test, and later on as a drug for the treatment of iodism. (1). Sulfanilic acid and the reasons advanced by Ehrlich for its use did not prove to be acceptable and sulfanilic acid reposed on the shelves of the chemist.

In 1908 Gelmo (2) prepared some sulfonamides from sulfanilic acid. About 1930 the red dye—azo sulfonamide—was synthesized, and it was this compound called prontosil that Domagk (3) in February, 1935, demonstrated to have the protective value against streptococcus and staphylococcus infection in experimental animals. A few clinical reports, however, had appeared as early as 1933 in the German literature on the use of prontosil in the treatment of erysipelas and other infections.

Sulfonamides were first used in this country in 1935 but it was not until 1936 that extensive clinical and experimental studies were started. The white compound originally called prontosil and now known as sulfanilamide was the one usually preferred.

Sulfanilamide has been tried in almost every infectious disease. The most satisfactory results were first reported in those produced by certain types of streptococci. Several hundred sulfonamide-containing drugs—classed as sulfonamides—have been prepared since in an attempt to improve the effect against the pneumococci, staphylococci, meningococci, gonococci, and other organisms.

This presentation is concerned with the results reported when sulfonamide compounds are employed in the treatment of various common skin diseases and what is just as important the ill effects that may follow the use and abuse of such drugs.

* Read at the New York Academy of Pharmacy, New York, April 30, 1942.

Skin Diseases (Bacterial in Nature) Favorably Influenced by the Sulfonamides

There are about 500 different skin diseases (4). About 15 per cent. of these are due directly to various bacterial organisms. It is in the latter group that the sulfonamides have received an extensive trial.

TABLE I

Effects of Sulfonamides on Various Common Skin Diseases Caused by Bacteria

Disease	Effective	How Used	
		Internal	External
Abscess—Cellulitis—Lymphangitis	+ ?	✓	✓
Boils			
Carbuncle	+ ?	✓	✓
Furuncle	+ ?	✓	✓
Styes	+ ?	✓	✓
Burns			
2nd and 3rd degree	+ ?		✓
Chancroid—soft chancre	+	✓	✓
Erysipelas	+	✓	
Dermatitis (Eczema)			
Infectious types	+ ?	✓	✓
Infected athlete's foot	+ ?	✓	✓
Erythemas, Hives, etc.			
Due to infection	+ ?	✓	
Folliculitis			
Sycosis of bearded area	?	✓	✓
Gas Gangrene (certain types)	+	✓	✓
Impetigo—ordinary	+ ?		✓
New born	+	✓	✓
Lupus Erythematosus *	+ ?	✓	
Paronychia ("runa-round")	+ ?	✓	✓
Scarlet Fever and other Communicable Diseases			
Complications	+ ?	✓	
Syphilis **	No		
Tuberculosis (skin)	No		
Vincent's Infection **			
Trench mouth	No		
Wounds, Ulcers (infected)	+	✓	✓

* Exact nature of infection in dispute.

** Spirochetal infection.

Table 1 lists only the more common skin affections attributed to various bacteria. It is usually one of the staphylococci or one of the many types of streptococci that are the trouble makers. There are other skin conditions produced by various other organisms. They are not listed in this table because they are rather uncommon and, therefore, beyond the scope of this paper.

It will be seen that the sulfonamides act effectively in erysipelas, chancroid (soft chancre) and infected wounds (burns and ulcers). Signs of improvement should be noticeable in a few days. The drug is given by mouth, usually in average doses except in those skin diseases where a blood stream infection is present or apt to develop. Preliminary intravenous and intramuscular injections may be resorted to in special cases. In order to be effective it is usually necessary for certain concentrations of the drug to be present in the blood. At present, preference is being shown to sulfadiazine as it is effective against different organisms and less toxic. A change may be made to sulfanilamide, sulfapyridine or sulfathiazole, or any of the newer compounds, if no effect is obtained or if the patient cannot tolerate any particular sulfonamide. The pure sulfanilamide powder is being applied externally to infected ulcers, chancroid, and the soluble sodium salt of the various sulfonamides is being applied as a local application to burns, impetigo, boils and carbuncles, abscesses and other infected eruptions (infected ringworm and eczema) with favorable results in some cases. Ointments of sulfonamides are also being employed.

The patients have to be under medical supervision because other measures, surgical and otherwise, may have to be used in addition. One must be on the alert for warning signals of intolerance to the drug. Absorption into the circulation takes place even when the drug is applied locally. The physician has to distinguish between the complications that may arise from the more serious infections that may start in the skin and become generalized with or without blood stream infection (cellulitis, carbuncle, extensive 2nd and 3rd degree burns, lockjaw, gas gangrene, etc.) and those due to the drug.

It is not advisable to use the sulfonamides in minor infections of the skin (impetigo, sycosis of the skin, styes, etc.) unless the old established remedies fail to cure the skin infection. The protective value of the sulfonamides to prevent complications of a more serious nature also enters into consideration in making the decision whether or not a sulfonamide preparation should be used.

Action of Sulfonamides in Skin Diseases Due to Certain Fungi and Viruses

In certain types of skin infections produced by the ray fungous (lumpy jaw), and certain rare types of fungous infection (blastomycosis and sporotrichosis) good results have been obtained sometimes by the use of the sulfonamides.

More recently virus infection in man has assumed importance. There are a number of skin diseases attributed to these ultramicroscopic bodies. These are warts, fever sores, shingles, chicken pox, measles, small pox, to mention a few of the common ones.

The sulfonamides are the treatment of choice in only one of these, i. e., lymphogranuloma venereum, a disease formerly considered as prevalent in the tropics and now shown to be frequent enough in this country to be classified as the fourth venereal disease. It is characterized by pus forming swellings (buboes) usually in the groins with other complications that appear much later.

The sulfonamides have been found to prevent complications in measles and other infectious diseases.

Miscellaneous Skin Diseases—Questionable or No Effects From Sulfonamide Therapy

The sulfonamides have no effect whatever in such common skin diseases as ordinary acne, eczema and psoriasis. Animal parasites like mites, lice, etc., are also not influenced. It has no effect on uncomplicated ringworm of the skin (athlete's foot, ringworm of the scalp and body). The action of sulfonamides is as yet debated in such skin conditions as lupus erythematosus, pemphigus, and other skin affections characterized by itching and blister formations. It is useless in syphilis, tuberculosis of the skin and trench mouth.

Reactions From Sulfonamides

The reasons for the caution in the use of the sulfonamides is shown by the ill effects listed in Table 2. These may be of a serious nature and if not recognized early enough may even become fatal.

Reactions may appear from any of the sulfonamides. Sulfathiazole and sulfapyridine are apt to affect the kidneys. All of them are apt to produce itching and various rashes. Conjunctivitis and nodular swellings usually denote the use of either sulfathiazole, sulfa-

pyridine or sulfadiazine. A peculiar fruity odor is noticeable in some who are taking any of these drugs.

TABLE 2

Reactions From Treatment With Sulfonamides

Blood Disturbance	Nervous System
Simple Anemia	Headache
Severe Anemia	Mental disturbance
Excess of white cells	Neuritis
Diminution of white cells	
Cyanosis	Skin Rashes
	Itching
	Body odor (fruity)
	Measles-like
	Scarlet-like
	Blisters in skin and mouth
	Nodular swelling
	Purpura (hemorrhages in skin)
	Sensitivity to sun (ultraviolet rays)
	Inflammation of eyes and optic nerves
Kidney	
Bloody urine	
Stone formation (colic)	
Uremia	
Liver	
Nausea, vomiting	
Jaundice	

The skin rashes usually appear after the drug has been used for about one week, irrespective of the dose. They are apt to be accompanied by fever if sulfathiazole is the one being employed. The more serious reactions may appear much earlier.

The eruptions from sulfonamides are considered mostly due to the development of individual sensitivity. In other words, it is not the drug that is at fault but as in the case with foods, pollens, etc., it is the peculiar change that develops in the tissue of certain individuals as a result of taking the drug, that is believed responsible for the unusual effects. This alteration in individual behavior to the drug is technically called allergy. It cannot be determined beforehand because at first there are no signs that indicate that the drug cannot be taken. Those who are subject to hay fever, asthma, or other diseases due to allergy are sometimes more susceptible than those not so affected.

Not all reactions from these drugs are due to allergy. In some, exposures to the sun encourages the development of a sulfonamide

eruption. Some of the effects on the kidney are mostly due to a change in the drug (sulfathiazole, sulfapyridine, sulfadiazine), produced by the body (conjugation), whereby an irritating crystalline compound is formed. Other more serious effects like those of the blood, liver and nervous system, are of a poisonous nature. The latter are in part due to poor elimination of the drug from the body or because of some abnormal function of some of the internal organs.

All the various reactions may be reduced to a minimum or even eliminated if the sulfonamides are used with understanding and discrimination. Other aniline drugs (acetanilid, phenacetin) should not be used concurrently with the sulfonamides. Epsom salts and other sulfur containing compounds should be avoided. Plenty of water with some bicarbonate of soda is usually advisable while the sulfonamides are being taken.

It is believed that the sulfonamides act as a hindrance to the growth of the bacterial organisms, prevent them from multiplying and thus allow the tissues to exert their normal protective action which leads to the destruction of the invaders. This deterrent action has been demonstrated in animals and in test tube experiments. How it does this is still in the process of investigation.

The action of the sulfonamides may be nullified by the use of one of the vitamins, para aminobenzoic acid, prematurely heralded as a cure for gray hair.

Summary and Conclusions

The discovery of the remarkable curative action of the sulfonamides in pneumonia, meningitis and gonorrhea is the greatest achievement of modern medicine.

The favorable action of the sulfonamides is obtained in certain skin diseases in which bacteria (streptococci or staphylococci) are the direct or indirect cause of the skin affection. Erysipelas, chancroid, infected wounds and ulcers, 2nd and 3rd degree burns, gas gangrene, and a virus disease (inguinal buboes) are the ones in which the sulfonamides are reported of value.

The sulfonamides have no effect on other skin diseases like acne and psoriasis or ringworm infections like athlete's foot, or scabies and lice infestation.

The sulfonamides have no effect on syphilis and tuberculosis of the skin.

The sulfonamides are mostly administered by mouth, in average doses. Local applications—ointment, powder or solution—are all that may be necessary in certain cases.

At present, preference is being shown for sulfadiazine because it is less apt to cause reactions. Substitution to sulfanilamide, sulfapyridine, sulfathiazole or any of the various compounds may be made if necessary.

Skin reactions and other more serious effects on the blood, kidneys, liver and nervous system may appear following the use of the sulfonamides.

Under medical supervision, these reactions may be reduced to a minimum or entirely avoided.

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MILD TINCTURE OF IODINE

This preparation is, and has been official in the U. S. P. since 1936. The recent emphasis given it by its description in the official "Red Cross First Aid Manual" has led to greatly increased demand for this product. It is far superior to regular tincture of iodine as a simple germicide since the regular tincture frequently causes irritation and tissue damage by reason of its excessive strength. The formula is as follows:

Iodine	20 gm.
Sodium Iodide	24 gm.
Diluted Alcohol to make	1000 cc.

It should bear the usual poison label bearing title, antidote and name and address of dispenser.

SHALL WE CONTINUE LATIN (OFFICIAL) TITLES ON PRESCRIPTIONS?

By Leonard A. Seltzer

The use of Latin in prescription writing is both defended and defamed. A recent paper at the Convention of the A. M. A. took the negative. The side for the affirmative is herein presented by Dr. Seltzer, a well-known professional pharmacist and educator.

"A PLEA to physicians of the country to strip the mystery from their profession by writing in English instead of Latin was made by Dr. Wallace M. Yater of Washington, Chairman of the A. M. A. Section of Experimental Medicine"—news item.

The writer presumes that the Chairman of Experimental Medicine and Therapeutics refers not to that part of the prescription giving the directions to be placed on the label, but to the titles specified on the prescription.

The writer takes issue with Dr. Yater, on the ground that we should not allow the obsession to use the vernacular, even though in some cases no vital matter is at stake, to deprive us of the protection of a definite scientific nomenclature when in so many instances a matter of grave import is involved.

It is not by accident nor by the whim of man that the nomenclature employed in identifying the stars of the heavens, the birds of the air, the creeping things in the earth, the beasts of the field, the plants covering the same, and the fish of the sea and "whatsoever passeth through the paths of the sea" is expressed in a universal language rather than the various vernaculars of different peoples. Science has thus reversed and emphasized the effect of the crisis described on the plain of Shinar when the universal language is said to have been supplanted by the vernacular, which resulted in confusion and put a stop to the project under construction. This reversal by science came about because science recognized the fact that progress was dependent upon the cooperation and contribution of ideas by men of all races, and was not limited to any particular political division or territory.

An idea has no value to others unless it finds expression in language and unless the subjective concept of all using any word finds objective correspondence in the thing itself. Thus, to refer again to the confusion at Babel, when the subjective concept of the word *brick*, for instance, in the mind of the man needing one and the concept of the same word in the mind of the man asked to bring it to him was a *shovel of sand*, the objective concept of the two men failed to agree and confusion resulted. One illustrative application will suffice. There are in every locality plants whose roots are crooked and these are in many cases called *snakeroot*, not because they have anything in common with snakes, but because they are crooked. There are approximately a dozen snakeroots in the United States listed in one compendium, and doubtless there are scores of others unlisted in this country alone. How many there are in different parts of the world, any one of which may be asked for by anyone composing the mixed population in our cities, the writer does not know. What shall the pharmacist supply if a client from Michigan asks for *snakeroot*, or one from Texas calls for something using the same name but having a different local significance, or if coming from another part of the globe he asks for *schlangewurtzel*, or some other term in the vernacular of his homeland? If the man from Dakota or Texas or even a Chinaman had asked for *Serpentaria* or *Senega* or *Cimicifuga*, etc., no one in the United States or in China would have any doubt as to what was desired.

While the practice of medicine is often regarded as failing to qualify as an exact science, nevertheless it is hardly in danger of the criticism of practicing Witch Doctor methods, because it uses the nomenclature which can be universally understood by the initiated and which is recommended and accepted by science for the purpose of definiteness. At any rate, for those cases in which Medicine contacts and appropriates to itself certain sciences, confusion is avoided by the use of the nomenclature which science, by experience, has found most expedient. For instance, Anatomy is a science, and, for the same reason that other sciences find it necessary to employ scientific nomenclature, it follows suit in naming the bones, muscles, vessels, and organs of the body. Would Dr. Yater recommend the substitution of the vernacular for the scientific nomenclature and employ such terms as leg bones, arm bones, head bones, back bone, etc.? Might not the student, in learning a name for a bone which he has

never named before, as well learn a scientific name as a name in the vernacular? Whenever a new object comes into our experience, we are under the necessity of giving it a name; for instance, when we devised a contrivance for conveying our voice at long distance, we gave it a classically-derived name—*telephone*, a name now universally understood. The Germans called the same contrivance a *fern-sprecherapparat*, the vernacular title not understood outside the language. More Germans prefer to use the classically-derived title rather than their own vernacular title, which is also true of *telegraph*, *automobile*, *elevator*, and many others. And so the student of *Materia Medica* is not placed under any inconvenience in learning the Latin titles, because practically all of the substances are those for which he has in his vocabulary no name to apply, and it requires no more effort to identify this new substance as *Cinchona*, for instance, than as *Peruvian bark*; in addition, the word *Cinchona* refers to *definite official species*, while there are a dozen or more important species of Peruvian barks, not to mention fifty or so of less important ones. When one takes into account that every botanical drug averages five or six synonyms, and perhaps the same number in other languages, and that many of these titles are ambiguous and not included in any compendium that contains them all, and that over against this a pharmacist can have at his disposal a complete compendium of scientific titles, the tremendous advantage of the Latin title over the vernacular becomes obvious in any intelligent consideration. Objection might be raised that botanical drugs do not play an all-important part in medicine today, but scientific nomenclature applies to drugs and chemicals other than those of botanical origin and for the same reason. The discussion has been gone into at length not because it has any direct bearing on the relationship between pharmacist and physician—it may even be contended that in many of the cases it makes little difference whether the type of orders referred to, when given by the laity, are accurately interpreted or even whether they are executed at all or not. The reason for the discussion is that Dr. Yater recommends the abandonment of accurate and definite nomenclature on physicians' prescriptions, precipitating the same type of confusion as that already described.

We submit that if there is any service in the world in which accurate specification and interpretation are the *sine qua non*, that service is the specification and interpretation of prescriptions. The

need is not for less use of Latin on prescriptions but for more of it. That the purpose of using Latin titles is "hoodwinking" the patient, as implied, or as is the common opinion of the ill-advised is as unfounded as it is absurd.

Therefore, as concerning Witch Doctor methods alleged to be practiced when refraining from any discussion with the patient concerning the medicine prescribed for him, it can only be said that this matter is entirely up to the physician. Members of the legal profession as well as of the medical profession are consulted by their clients on account of their special training and ability to advise in matters referred to them, in which they (the patients) wisely feel incompetent to act. It is the common experience of both professions that to go into unnecessary detail in matters which their patients are unable to digest not only invites confusion but almost invariably leads to trouble and embarrassment. The writer knows of no mistake which as a professional pharmacist with 50 years' experience he guards against so meticulously as that of discussing the contents or nature of his prescriptions with the patient. He knows and appreciates the unfounded prejudices of the layman: any narcotic is "dope"; to tell a layman that the doctor has prescribed calomel is sure to bring embarrassment to the physician in many cases. Most laymen know that digitalis is a heart medicine; many know of no other use for this drug. To tell such an individual that his medicine is or contains digitalis might cause him to die of fright right in front of the counter even if there was nothing the matter with his heart.

Lastly, there is no way by which a physician can induce his patient to take the case out of his hands, prescribe for himself, and play into the hands of the radio announcer more surely than to disclose to his patient the name or identity of the drug he is prescribing *in his particular case*. The radio announcer assiduously sows the seed of his propaganda with subtle tact by inculcating the idea that the medicine he advocates and which bears the name of the medicine discussed by the physician has the endorsement of the latter *for all cases*. Thus, the patient is induced to take charge of his own case and that of his friends to his and their undoing and to the elimination of the physician. This is everyday experience of radio listeners.

The conclusion of this discussion is, therefore, that the physician continue to use and to develop further scientific nomenclature in pre-

scribing, and that he continue to use his best judgment in discussing the details of the case with his patient, giving due consideration to the misinterpretation which may result and the opportunity for unfavorable propaganda which is sure to be taken advantage of.

PHARMACOPŒIAL NOTES

The announcement has been made by the Revision Committee of the U. S. P. that certain new drugs are now official by interim revision. These drugs, all listed in the forthcoming revision of the Pharmacopœia, are released in advance in order to expedite their use by the armed forces and the Red Cross. They are as follows:

Pamaquine Naphthoate
Quinacrine Hydrochloride
Quinacrine Hydrochloride Tablets
Totaquine
Citrated Normal Human Plasma
Normal Human Serum
Water for Injection
Sulfathiazole
Sulfathiazole Tablets
Sulfanilamide Tablets

In addition, the test for pyrogens in injection water and the chapter on injections are released.

The Digitalis standards of the U. S. P. XII have been released as well as the new method of assay for a similar reason. Attention is drawn to the fact that the U. S. P. XII preparations of Digitalis will be considerably weaker than the U. S. P. XI but still more potent than the U. S. P. X. Clinicians should be warned of this variance.

ADSORPTION OF ACIDS BY ANIMAL CHARCOAL

By Saul Caspe

The adsorption of acids by charcoal has been debated for some time. Mineral constituents which are present are held the factor responsible. A general review of papers on this subject is presented.

ADSORPTION of acids by charcoal has been accepted *prima facie* and recorded in standard chemical texts although the particular and general theories in explanation of this phenomenon are in a constant state of flux. Not alone the theories but also the occurrence of an acid adsorption by certain types of specially prepared charcoals are questionable.

The ultimate hope of elucidating this phenomenon, and of definitely demonstrating it, has recently made this subject one of intense research. It is the main purpose of this paper to offer conclusive proof that so-called acid adsorption by animal charcoal is a chemical reaction which does not occur upon the surface. In fact it is a reaction between the acid and the mineral ash contained as an impurity in the charcoal. To help appreciate the central point of this discussion, it is deemed interesting and stimulating to survey and review prior contentions, proofs and theories with respect to the general subject of charcoal adsorption.

In 1907, H. Freundlich (1) conducted experiments on the adsorption of aliphatic and aromatic organic acids from their solutions by Merck's purest blood charcoal, and by a repurified sample of Merck's charcoal. He found both charcoals (containing 5 per cent. and 8 per cent. impurities) adsorbed acids with the following order of diminishing adsorbability; aromatic, aliphatic and acids with sulfo groups. His method for determining adsorption was simply the observed decrease by alkalimetric titration of acid concentration in an acid solution after treatment with charcoal. Freundlich proposed the theory (Gibb's principle) that substances that lowered surface tension must be strongly adsorbed. A. Reychler (2) expressed his belief that the Freundlich adsorption was due to the formation of compounds and the alkalinity of the blood charcoal. However, many chemists have upheld the view of surface adsorption (3, 4, 5). In

fact one of these chemists (4) pointed out that animal charcoal exhibited greater powers of adsorption than other charcoals. The first real controversial notes were made by Pavlov (6) who worked with animal charcoal and hinted of chemical adsorption, solid solution, and combination of acids with the complicated organic impurities of charcoal. Kraetz (7) formulated the idea of neutralization when the pH of a solution varied from the isoelectric point of charcoal. Schilov and Chumster (8) studied the adsorption of hydrochloric acid by gas-free charcoal. Studies on the adsorption of organic and inorganic acids by animal and wood charcoals have been made by several chemists and the data are available in the literature. Bartell and Miller (9, 10) found that pure (ash-free) sucrose charcoal adsorbed organic acids, and they proposed the hydrolytic theory of adsorption. The problem of understanding charcoal adsorption phenomena becomes very complicated the more complex are the impurities. Even in an ash-free sucrose charcoal, data must be given as to its preparation and organic impurities. Kruyt and Kadt (11) claim that carboxylic and carbinol groups form upon the surface of ash-free sucrose charcoals to an extent dependent upon the temperature and process by which they are made, and that these groups may account for so-called acid and alkali adsorption. Alexander King (12) coined the term chemisorption in explanation of the phenomenon exhibited by purified sugar charcoals which were shown to contain acidic surface complex O-C. The decolorizing properties of bone black were shown by Patterson (13) and Hall (14) to be due to the nitrogenous decomposition products of bone cartilage and the empirical formula of these compounds was determined.

Caspe (15) discussed errors inherent in text book experiments which described acid adsorption by animal charcoal, and experimentally arrived at the conclusion that this so-called adsorption was a chemical reaction between the impurities and the acid. In animal charcoal phosphates were shown to be the principal mineral impurity. Because of the buffering action of certain phosphates there is a titrametric difference demonstrated by alkalimetric titration of acid solution before and after shaking with animal charcoal. This difference is evident because in alkalimetric titration we are dependent for our end point on pH values.

Reviewing the status of the experimental evidence and theories evolved, one finds a lack of absolute evidence for animal charcoal

adsorption. The phenomenon has been taken for granted to occur. By observing the reduction of titratable hydrogen in acid solutions after so-called adsorptions, animal, wood, blood and sucrose charcoal have been shown to adsorb organic and inorganic acids in decreasing amounts, i. e., animal charcoal is the most efficacious adsorber and sucrose charcoal is the least. The mechanisms involved in adsorptions are still moot questions, and with the exception of Kruyt's, King's and Bartell's explanations in regard to sucrose ash-free charcoal, we possess no general mechanistic interpretation. However, we do possess a fecund data and many undemonstrable suggestions. It is the author's contention that each type charcoal manifests a distinct acid adsorbing mechanism dependent upon the nature and quantity of impurities contained in each. In view of the fact that acid adsorption phenomena have been ideally applied to animal charcoal, our experiments were conducted upon this particular class of charcoals.

Experimental

A complete quantitative analysis of our charcoal before and after acid adsorption correlated with similar analysis of the acid solution after adsorption treatment would give us incontrovertible evidence of what has taken place. If we can prove that a dilute hydrochloric acid solution after treatment with animal charcoal is weaker in hydrogen, but *not* in chlorine anion, we will be privileged to conclude that hydrochloric acid is not adsorbed. That hydrogen is either eliminated as water or partly untitratable as phosphoric acid has been dwelled upon in a previous article (12) and we will assume that the fate of reduced hydrogen concentration has been accounted for. Hydrochloric acid is used in these experiments because its anion can be more accurately determined than those of acetic and formic acid. A method for determining the organic anions is being worked out now.

Two (2) grams of animal charcoal (65 per cent. ash) were shaken with 100 cc. of approximately N/20 HCl for twenty (20) minutes. The solution was then centrifuged from the charcoal which settled out. The supernatant liquid and the stock solution of N/20 HCl were titrated for acidity and chlorine content. Two grams of this animal charcoal were also shaken with 100 cc. of approximately N/20 acetic acid for twenty (20) minutes. In manner similar to the N/20 HCl, the supernatant liquid was obtained, and aliquot

portions were pipetted out for titration. Phenolphthalein was used as an indicator in the acidimetric titration. The chlorine was determined by the Whitehorn (16) modification of the Volhard method.

REDUCTION IN ACIDITY

Solutions	Quantity of Solution	Titre (average)
stock	20 cc. N/20 (approx.) Acetic Acid	22 cc. N/20 NAOH
stock	20 cc. N/20 (approx.) HCl	23 cc. N/20 NAOH
stock after shaking with charcoal	20 cc. Acetic Acid	12.4 cc. N/20 NAOH
stock after shaking with charcoal	20 cc. HCl	13.1 cc. N/20 NAOH

NON-REDUCTION IN CHLORINE CONCENTRATION

Solutions	Quantity of Solution	Titre (average)
stock	4 cc. N/20 (approx.) HCl	13.3 cc. AgNO ₃
stock after shaking with charcoal	4 cc. HCl	13.25 cc. AgNO ₃

AgNO₃ solution contains 0.00295 grams/cc. AgNO₃.

Phosphate determinations upon the acetic acid and HCl solutions after shaking with charcoal indicated the same phosphate concentration in both.

Conclusion

1. After shaking with animal charcoal N/20 HCl exhibits similar reduction of titratable hydrogen as N/20 acetic acid.
2. After shaking N/20 HCl with animal charcoal, there is *no* reduction in chlorine anion.
3. The HCl and acetic acid solutions after shaking with the animal charcoals contain the same amount of phosphate.
4. Animal charcoal neither adsorbs HCl nor other acids but, the charcoal impurities principally the phosphates, react with acids to form phosphoric acid and thus a partially untitratable hydrogen results.
5. The chlorine anion remains unaffected by this reaction.
6. Thus, a mechanism for the so-called acid adsorption by animal charcoal is definitely demonstrated and explained as a simple reaction mechanism *not* occurring upon the surface.

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SELECTED ABSTRACTS

From the Current Scientific Literature

Studies of the Addiction Liability of "Demerol" (D-140).

C. K. Himmelsbach. *J. Pharmacol. and Exper. Therap.* 75, 64 (1942) No. 1. This new drug, 1-methyl-4-phenylpiperidine-4-carbonic acid ethyl ester, known as "Dolantin" in Europe, was reported to possess definite analgetic and spasmolytic properties together with a mild atropine-like action. Withdrawal symptoms and clonic muscular twitchings following its administration led to this investigation.

Addicts with established physical dependence were stabilized on the respective minimal amounts of morphine needed to prevent signs of withdrawal. One week later Demerol was completely substituted for morphine. After 10 days the administration of Demerol was abruptly discontinued. Support of morphine physical dependence by Demerol was incomplete, but after its withdrawal signs of abstinence became intensified for two days, then waned. Not only was the Demerol abstinence syndrome less severe than that of morphine or codeine by objective criteria, but the subjective complaints were markedly reduced. Some of the patients remarked that the effect of the medication was similar to atropine or hyoscine. The majority liked the effects and considered the substitution to constitute a "good treatment" for withdrawal. The onset of the abstinence syndrome was more abrupt than that of morphine.

When given to former addicts hypodermically in progressively increasing amounts, and abruptly discontinued, definite but very mild signs of abstinence appeared, these intensifying after further administration. The objective criteria of abstinence was found to be less severe, but otherwise quite typical of, the morphine abstinence syndrome.

It is concluded that Demerol possesses addiction liability.

A. Z.

The Treatment of Typhoid and Dysentery Carriers with Succinylsulfathiazole. W. M. Kirby and L. A. Rautz. *J. A. M. A.*, 119, 615 (1942) No. 8. Since the bacteriostatic action of the sulfonamides is known to be dependent on the presence of the free amino group on the benzene ring, the mode of action of this compound needs to be explained. The drug is hydrolyzed in the intestinal tract, giving a concentration of free sulfathiazole of from 50 to 200 mgm. per cent., such concentrations having a strong bacteriostatic and bactericidal activity. The addition of the succinyl radical to the sulfathiazole molecule merely inhibits absorption from the gastrointestinal tract.

Succinylsulfathiazole, 0.25 gm. per kilogram, was administered to 11 persons, 3 without evidence of disease, 3 typhoid carriers, and 5 dysentery carriers, all of whom remained ambulatory throughout the course of the treatment. The daily dose was divided into four portions, which were taken at 8 A. M. and 1, 6, and 11 P. M., and the duration of administration of the drug varied from five to fourteen days.

The results were very gratifying. A decided alteration of the physical characteristics and bacterial flora of the stools was found. The drug was only slightly absorbed from the gastrointestinal tract, producing blood levels of free sulfathiazole of less than 1 mgm. per cent. and an average of less than 5 per cent. excreted in the urine. Dysentery bacilli disappeared from the stools of 5 carriers during drug administration and remained absent for periods of from 30 to 60 days. Typhoid bacilli remained viable in the stools of 3 carriers during two weeks of drug therapy. The only reactions noted were a tendency to pass frequent, loose stools and to have slight perianal irritation. Since it is only slightly absorbable into the blood stream, succinylsulfathiazole is much less likely to produce severe toxic reactions than sulfaguanidine.

Intraperitoneal Administration of Sulfanilamide—Editorial. *J. A. M. A.*, 119, 796 (1942) No. 10. Animal experiments of Key and Burford, Jensen, Johnsrud and Nelson, Key and Frankel have demonstrated that local application of sulfonamide drugs does not interfere with the healing of bones, muscles, connective tissue, joints, pleura and peritoneum.

Ravdin, Rhoads and Lockwood reduced the mortality rate of 1.5 per cent. in a series of 880 consecutive cases of acute appendicitis to that of 0.4 per cent. in a series of 257 cases by instituting sulfanilamide therapy of cases in which there was spreading peritonitis. The drug was administered hypodermically in an 0.8 per cent. concentration in isotonic solution of sodium chloride.

The intraperitoneal administration has in one case, for instance, reduced the mortality rate of 2.83 per cent. for 742 cases of acute appendicitis between 1935 and 1939, to no deaths in 400 consecutive cases at the Roosevelt Hospital. Emphasis is laid, however, on the fact that sulfanilamide applied locally in the peritoneal cavity is most effective in the invasive stage of the infection. It is far less effective in the presence of rank suppuration for its action is inhibited by peptones. Therefore, its use is particularly indicated when open anastomoses have been made, when there has been accidental soiling of the peritoneum, and when a walled-off abscess has been broken into and the remainder of the abdomen exposed to contamination. A thorough cleansing and aspiration of pus and infectious material from the abdomen is necessary in order to remove the inhibiting substances (peptones).

Hepatitis has been observed with sulfanilamide therapy. Since it was found that the concentration of the drug in the portal vein was forty times the concentration in the jugular vein, it was thought that to avoid damage to the liver, an interval of eighteen hours or more should elapse before giving sulfanilamide after the initial 5 mgm. per cent. concentration had been reached.

The dose may be calculated on the basis of 175 mgm. per kilogram of body weight for children and adults. This may be given as pure crystals of sulfanilamide at the source of infection and the powdered drug dusted around the remaining peritoneal cavity.

Vitamin A in Fish. J. A. Lovern. *Chem. & Ind.*, 61, 222 (1942) No. 20. Since the exploitation of halibut liver oil and of similar oils of high vitamin A potency it is widely appreciated that the distribution of vitamin A amongst the various species of fish is very uneven. Cod Liver Oil achieved its fame in the days before vitamins had been recognized, since it was the most abundantly caught fish hav-

ing a large and oily liver. Today much is known about the vitamin A content of different species of fish, but nothing at all is known about the reasons for the variations. The following generalities can be given:—(1) Small species of fish, as a rule, contain relatively low proportions of vitamin A; (2) very large species show a tendency to contain a high percentage, *e. g.*, halibut, tuna, certain sharks. There are certain notable exceptions such as certain other sharks and the large sunfish; (3) young specimens of any particular species are considerably poorer as sources of vitamin A than older fish.

Of interest is the discovery of vitamin A₂, which is found only in high proportion in free water fish. This vitamin is related to ordinary A, but the exact relationship is not known largely because of the difficulty in obtaining useful amounts of A₂ uncontaminated by A₁.

The origin of the enormous quantities of vitamin A in some fish—*e. g.*, a very large halibut may contain up to 90 gm. of vitamin A—is quite obscure. There seems to be nothing unusual about the habits of the halibut to account for this enormous deposition. It is possible that it may be synthesized and that it may also be needed for some other physiological purpose.

The distribution of vitamin A in some fish is unusual. In many species the position is the same as for mammals in that the liver is overwhelmingly the main storage depot, only traces being found in the other tissues. In other fish, of which the halibut is again a good example, the alimentary tract may contain as much or even more total vitamin A than the liver. A plant for the extraction of vitamin A from the intestines of fish has already been established in Canada. It is significant that the distribution in the various parts of the alimentary tract is very uneven. The œsophagus and stomach contain only traces while the intestine and pyloric cæca contain almost the whole amount. This means that the vitamin A is concentrated almost entirely in those parts of the tract where active absorption takes place. In the intestine and pyloric cæca themselves the vitamin A is concentrated almost entirely on the mucosal coat and it is believed that there are evidences of the role of vitamin A in the absorption of fats similar to the function of the phosphatides in mammals.

Eels are unique in that their flesh serves as a depot for vitamin A and their flesh is as rich in this vitamin as rich butter.

SOLID EXTRACTS

Of Interesting Facts

Since April 1st approximately 400,000 pounds of tin and other metals have been salvaged as a direct result of the effort of druggists and others dealing in toothpastes, shaving creams, etc. The tube for a tube plan, although it seems unimportant, helps us conserve this vital metal. There is said to be enough tin in 60 ordinary tubes to solder all the electrical connections on a bomber.

AJP

Over 500,000,000 pounds of natural rubber (220,000 long tons) are waiting for harvest on the deserts of six Western States according to scientists of the University of California. The plant commonly known as rabbit brush is its source. This plant can be processed like guayule and it yields a natural rubber which although not as good as the East Indian product is sorely needed nevertheless.

AJP

Seasickness is a malady that only those who have suffered it can fully appreciate. A recent review in *War Medicine* calls attention to a number of interesting statements concerning it. Some of these follow:

1. The main factor in the production of seasickness is the rapid acceleration and deceleration, especially up and down.
2. Acclimatization or the development of "sea legs" usually requires two to four days but it may take several weeks.
3. Individual ships have characteristic movements and rhythms and a person may become seasick on one ship and not on others.
4. Prophylactic measures comprise careful diet particularly before sailing, lying supine with the head directed toward the center of the ship, adequate rest and warm salt water baths (90-95° F.).

5. Treatment that has been recommended embraces rhythmic breathing (inspiring as the ship rises and exhaling with the last downward movement of the ship) abdominal belts and supports, and the use of sedatives.

Certain individuals are chronic sufferers from all kinds of motion sickness (bus, street car, train, etc.) and their efficiency at sea is so low as to warrant permanent shore duty.

AJP

An ether insoluble stopcock lubricant was recently described in an article appearing in Ind. & Eng. Chemistry. It is prepared by suspending 9 grams of soluble starch in 22 grams of glycerin and heating to 140° C. After standing a short time, the clear solution is decanted from the sediment and allowed to cool. After standing overnight it has a consistency like that of a heavy grease.

AJP

On every side we read that we can help win the war by investing our savings in War Stamps and Bonds. This, of course, deserves our full support, and will receive it even more so when we know that 25 cents will buy a dozen bandages for the army, \$1 will supply an arm splint and \$1.50 will provide a complete first aid kit.

The principal items of a chemical warfare protection outfit cost the government \$18.75 and, if you are interested in higher figures, 17 surgical beds may be provided through \$370 invested in War Bonds. These facts are taken from a folder distributed by the United States Government Printing Office.

AJP

A recent newspaper article describes a Chinese drug store in Philadelphia, typical of others in New York, San Francisco and elsewhere in this country. It tells of the apothecary's list of 266 vegetable, 100 animal and 30 mineral drugs, including ginseng, gentian, mercury, chrysanthemum, lotus, bile of beef, parts of dog, rabbit, sulfur and deer's horns. Nuts, barks, berries, roots and herbs play important roles in Oriental pharmacy. It seems that when Chinese are taken sick here in America, either they use old home country remedies that have been in use for centuries, or they turn immediately to the modern services rendered by present day hospitals.

It is interesting to note the derivation of the term "apothecary" now applied to pharmacists the world over. It comes from the Greek "apotheke" meaning storehouse, or place where things are put away.

AJP

According to a pre-war analysis of the chemical contents of the human body, made by someone with a bent for popular statistics, each one of us contains enough sulfur to rid a dog of fleas, lime enough to whitewash a chicken coop, fat enough for six bars of soap, iron enough to make a six-penny nail, a sufficient amount of phosphorus to tip 20 boxes of matches, sugar enough to sweeten 10 cups of coffee and potassium equal to the task of exploding a toy cannon. The total value of such commodities was 87 cents. What with iron on priorities, sugar being rationed, fat being salvaged, explosives requiring license, and the commodity index going up, up, up, we can be justified in feeling a little more important now than we did a year or two ago.

AJP

This is the time of year when Victory gardeners are of the opinion that certain insects must surely be Axis agents. There follows a table of insect control that may be of assistance in eliminating these outdoor pests:

Insect	Plant Attacked	Specifics
Flea Beetle	Tomatoes Potatoes	20-40 Copper Lime Mixture Derris Dust (¾% Rotenone)
Japanese Beetle	Corn	Dusting with Hydrated Lime Derris Root (¾% Rotenone)
Cabbage Worms	Cabbage Radishes	Pyrethrum Dust Derris Dust (¾% Rotenone)
Cabbage Aphis (Plant Lice)	Cabbage Radishes	4% Nicotine Dust Pyrethrum or Rotenone

Insect	Plant Attacked	Specifics
Tomato Aphis	Potatoes Tomatoes	4% Nicotine Dust Derris Dust or Pyrethrum
Tomato Fruit Worm	Tomatoes Corn	Lead or Calcium Arsenate Mixed with Hydrated Lime
Potato Beetle (Potato Bug)	Potatoes Tomatoes	Derris Dust Calcium Arsenate-Lime
Melon Aphis	Squash	4% Nicotine Dust
Mexican Bean Beetles	Lima Beans	Derris Dust ($\frac{1}{16}$ % Rotenone) Mexican Beetle Dust (with 25% Sulfur)
Garden Snails	Eat Small Plants	Lime-Soot-Bordeaux Mixture —Pyrethrum
Red Spiders	Lima Beans	Sulfur
Cutworms	Attack Young Plants	Paris Green or White Arsenic
Corn Ear Worms	Corn	Mineral Oil, to which is Added Pyrethrum
Squash Bug	Squash	Nicotine Sulphate
Carrot Weevil	Carrots	Poisoned Apple Pomage, to which is Added Arsenic
Bean Weevil	Stored Beans	Carbon Disulfide
Wire Worms	Many Vegetables	Dichlorethyl Ether-Soap Mixture
Ants	Carry Away Seeds	Pyrethrum Soap Liquid

AJP

It is gratifying to note that pharmacy students are among the selected groups in higher education eligible to apply for government loans under the provisions of a recent appropriation. Such grants will help junior and senior students complete their education and repay the loans after graduation.

BOOK REVIEWS

Two New Volumes Are Brought to Your Attention

The National Formulary, Seventh Edition. Revised and edited by the National Formulary Committee of the American Pharmaceutical Association. Mack Printing Co., Easton, Pa. Price: \$6.00.

The new N. F. is now available although the U. S. P. XII is not yet off the press. One finds 97 new monographs which in part are made up of drugs and preparations deleted by the U. S. P. Among the entirely new monographs are Ammoniacal Solution of Silver Nitrate, Zinc Eugenol Cement, Cherry and Raspberry Juice for making syrups, Merbromin (sold by H. W. & D. as Mercurochrome), Neocalamine, Neocalamine Lotion, Neocalamine Ointment, Pectin, Pectin Paste and Magma of Bentonite.

The section devoted to "Reagents and Preparations for Use in the Clinical Laboratory" has been greatly expanded and improved and this should be of real assistance to those pharmacists who are called upon to formulate and supply such products to laboratories or hospitals.

The new National Formulary has revised its manner of presentation of the text in the monographs in order to make it analogous with the U. S. P. which is a highly desirable feature since it simplifies the use of the two books concurrently which is usually the case.

The Committee and its Chairman, Dr. Powers, have done a commendable piece of work and the pharmaceutical profession may well feel proud of this outstanding effort contributed very largely by its members.

L. F. TICE.

Trade and Professional Associations of the United States. By C. J. Judkins, United States Department of Commerce. United States Government Printing Office, Washington, D. C. Price: 70 cents.

Attention is called to this excellent compilation of all the trade and professional associations in the United States. The information is so arranged that those groups concerned with any service or commodity can be quickly found and their business address or headquarters as well.

It is so well cross-indexed that little trouble is experienced in finding data with only a meagre clue. Over 3000 national and interstate groups are embraced, covering such fields as food, textiles, machinery, distribution, transportation, foreign trade, etc.

This is a commendable work and a worthwhile addition to every technical library.

L. F. TICE.



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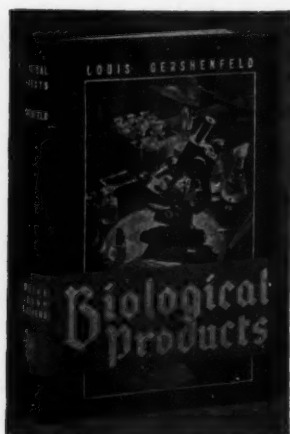
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